Cultivation of *Nepenthes* at Longwood Gardens An Update After 12 Years

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As Larry Mellichamp reported more than a dozen years ago in this journal, by the 1950s the Missouri Botanical Garden had developed one of the finest *Nepenthes* collections in the world under the direction of George H. Pring. In 1956, after retiring from Missouri, Pring brought representative specimens to Longwood to ensure the continued preservation of the collection.

Efforts were made in succeeding years to obtain specimens from all over the world to improve both the quality of breeding stock and the probability of desirable male and female specimens being in simultaneous bloom. In 1967-1968, Pat Nutt, the horticulturist responsible for the *Nepenthes* collection at Longwood, began a hybridization program with some success.

Longwood is a display garden and research must necessarily take second place to this primary function. Severe limitations of time and space and the increasing cost of heating over the years have prevented unrestricted expansion of the *Nepenthes* collection. There is no organized *Nepenthes* hybridization program currently underway. Despite this, we are happy to report that *Nepenthes* still flourish here. Both a growing house, devoted to propagation and maintenance (Illustrations 1 and 3), and a large display area (Illustration 2) are provided for *Nepenthes*. Species and hybrids grown at Longwood are listed in Table 1.

Nepenthes are grown under the following cultural conditions. Large specimen plants for display are grown in wooden slat baskets with dimensions of 8 x 8 x 6 inches (20 x 20 x 15 cm). Plants are frequently pruned to stimulate basal growth and produce numerous lower pitchers which are generally more attractive than upper pitchers. Rooted propagations and backup plants are grown to display size in clay pots.

The medium currently used is 50% osmunda fiber broken into 1 to 2 inch (2.5 to 5 cm) fragments and 50% long fiber sphagnum moss. The medium is thoroughly soaked in water before being used to pot up plants. Previously a mixture of equal parts medium fir bark, charcoal pieces, coarse perlite, and long fiber sphagnum was used with success as a growing medium but it was found to decompose more rapidly, requiring us to frequently repot in order to maintain healthy plants.

Humidity in the growing house is maintained above 80% with an automatic centrifugal humidifier and humidistat supplemented by frequent hand syringing. Temperature levels are maintained above 62°F (17°C) during winter nights with steam heat and above 72°F (22°C) during the day. Ventilation is kept to a minimum to maintain high humidity even in summer when temperatures rise due to solar heating.

Minimum light levels occur in winter so all shading is removed from the house. By April 1, 50% shading is applied to reduce light levels to approximately 4000 foot-candles. All baskets are thoroughly watered each day with warmed well water, but pots are watered every other day.

Nepenthes are fertilized once a month with 1/3-strength Peters 20-20-20 both as a foliar spray and as a root drench. As a supplemental feed, seaweed fertilizer has been used for its trace element content.

Nepenthes are propagated in 2-inch-diameter x 3-inch-high (5 x 7.5 cm) clay pots in the same 50% shredded osmunda fiber/50% long fiber sphagnum medium used to grow display plants. A mixture of half peat moss and half coarse perlite has been used

Illustration #1. The Nepenthes growing house. The mist propagation area used to root *Nepenthes* is shown in the foreground. Backup plants are grown in clay pots with large plants in overhead slat baskets. The centrifugal humidifier can be seen in the center of the house overhead. Photo by Larry Albee, Longwood Gardens.

Illustration #2. *Nepenthes* and Bromeliad display house. Hanging slat baskets are used to grow and display large *Nepenthes* plants which are groomed to stimulate pitcher growth. Photo by Larry Albee, Longwood Gardens.

Illustration #3. Pruning and maintenance of *Nepenthes* in a basket. Rolfe Smith feeds a trap of *N. x dyeriana*. Photo by Larry Albee, Longwood Gardens.

Illustration #4. *Nepenthes truncata*. Photo by Larry Albee, Longwood Gardens.

Illustration #5. *Nepenthes villosa.* Photo by John de Kanel/Rolf Smith.

Illustration #6. *Nepenthes truncata x N. alata.* Photo by Larry Albee, Longwood Gardens.

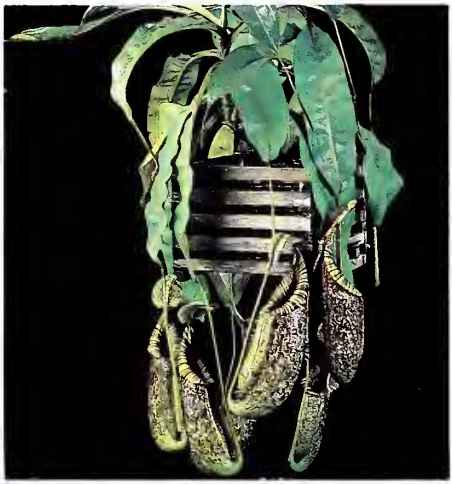

Illustration #7. *Nepenthes x mixta.* As reported in *Gardeners' Chronicle* (1893), "Under this name we now publish a figure of a *Nepenthes* raised in Messrs. Veitch's establishment between *N. Northiae* and *N. Curtisi* and which in consequence received the provisional name of *N. Northisii.* This name was indicative of the mixed origin of the plant, but was objected to as implying the existence of a Mr. Northis, a shadowy personage who has no real existence. It may be better designated as *N. mixta.*" Photo by Larry Albee, Longwood Gardens.

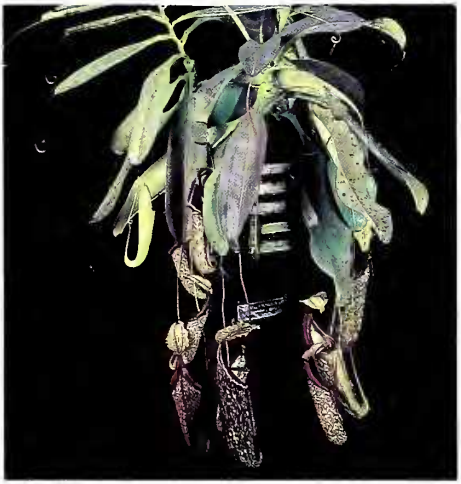

Illustration #8. *Nepenthes x dyeriana.* This plant resulted from hybridization of *N. x mixta* and *N. x dicksoniana* and was described in the *Gardeners' Chronicle* of 1900 as the finest of the season and, with the exception of *Nepenthes northiae,* the finest *Nepenthes* yet introduced. It was grown and raised in the nurseries of James Veitch & Sons and was first exhibited at a meeting of the Royal Horticultural Society. It was appropriately named for Sir William Thiselton Dyer, the director of Kew Gardens, who had constructed the *Nepenthes* stove house at Kew. Photo by Larry Albee, Longwood Gardens.

with success in the past. Cuttings are taken so that five closely spaced nodes are present on each. The apical meristem is removed. The next two leaves down the cutting are cut in half to reduce transpiration. The lower two leaves are cut off to expose nodes which are dipped in commercial rooting compound containing 0.4% indole-3-butyric acid and 15% thiram fungicide in talc. The treated nodes are then wrapped in the growing medium and inserted in the pots. The cuttings are rooted on a mist table with 70°F (21°C) bottom heat under ambient greenhouse conditions of temperature and light with intermittent mist (12 seconds on every 12 minutes during daylight hours). See the photograph of propagation area in Illustration 1. Fine roots are usually visible extending from the cuttings through the bottom of the pot within two to three months. The success rate exceeds 95%.

Large, clearly labeled display plants in hanging baskets currently share a brightly lighted house with bromeliads and other tropicals (Illustrations 4 - 7). Humidity is maintained with an overhead high pressure mist system at above 80%. Plants are rotated with those in the growing area to keep the best pitchers on display at all times.

Construction plans at Longwood Gardens calls for the removal of all N*epenthes* from the present display house. They will be relocated to an area with ferns and other insectivorous plants. Localized fog systems to maintain a humid micro-environment in the areas to be occupied by *Nepenthes* baskets will be necessary. We look forward to reporting on an even better display after another decade has passed. We recommend that anyone interested in these unusual plants plan a trip to Longwood Gardens, just a 30-minute drive southwest of Philadelphia.

References

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Table 1A

***Nepenthes* Species in the Longwood Collection**

N. alata (4 forms)	N. maxima
N. ampullaria	N. mirabilis
N. bongso	N. rafflesiana
N. burkei	*N. rafflesiana cv.* Vittata
N. fusca	N. thorelii
N. hirsuta	N. truncata
N. hookeriana (natural hybrid)	*N. ventricosa* (2 forms)
N. khasiana	N. villosa

Table 1B

Nepenthes Named Hybrids in the Longwood Collection

N. x atrosanguinea
N. x balfouriana
N. x boissiense
N. x chelsonii
N. x coccinea
N. x dormanniana
N. x dyeriana
N. x edinensis
N. cv. Ile de France
N. x intermedia
N. x mixta
N. x mixta cv. Superba
N. x morganiana
N. x paradisae
N. cv. Rokko
N. x williamsii
N. x wittei
N. x wrigleyana

Table 1C[1]

Nepenthes Named Hybrids which are not documented by Schlauer (1986)

N. x excellens **Bednar** = *(N. thorelii x N. maxima) x N. x mixta*
N. cv. Hachijo **Okuyama** = *N. thorelii x N. mirabilis*
N. x leessii **Bednar** = *N. mirabilis cv.* Gold Star x *N. x mixta* cv. Superba
N. x lesliei **Dodd** = *N. ampullaria x N. veitchii*
N. x margaretea **Bednar** = *N. kampotiana x N. ventricosa*
N. x splendiana **Bednar** = *N. kampotiana x N. maxima*
N. cv. St. Louis **Pring** = *N. x chelsonii x N. x dominii*

Table 1D[1]

Nepenthes Unnamed Hybrids in the Longwood Collection

N. x coccinea x N. x williamsii
N. x dyeriana x N. thorelii
N. globamphora x N. ventricosa
N. cv. Lt. R.B. Pring x N. hookeriana
N. cv. Lt. R.B. Pring x N. x intermedia
N. maxima x N. x mixta
N. maxima x N. thorelii
N. merrilliana x N. alata
N. x. mixta x N. mirabilis
N. rafflesiana x N. hookeriana
N. thorelii x N. x wittei
N. truncata x N. alata
N. veitchii x N. thorelii
N. ventricosa x N. alata
N. x wittei x N. thorelii

[1] Names in formulas are arranged in the way the plant was identified when Longwood received the plant. The sex of parent plants should not be assumed from this.

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